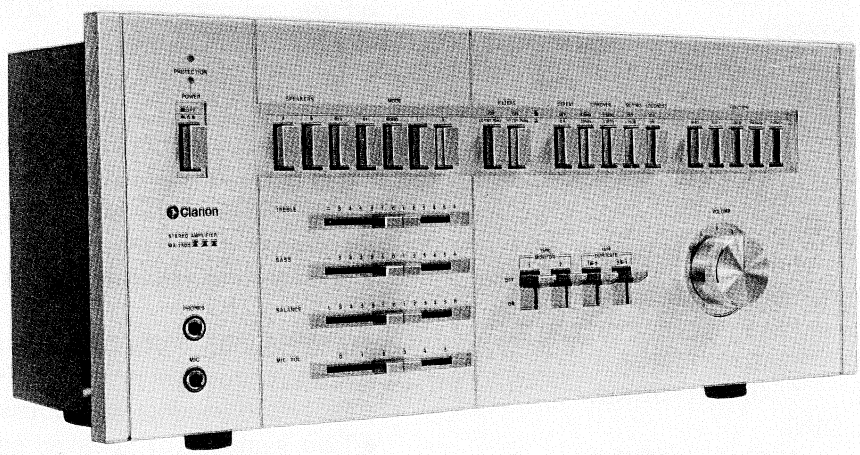
Clarion

SERVICE MANUAL

Closer Relations through "CLARION SERVICE MANUAL"

MODEL MA-7800E

Manufacturer CLARION CO., LTD. / Export Division CLARION SHOJI CO., LTD.
3, Kojimachi 5-chome, Chiyoda-ku, Tokyo, 102 Japan Tel: (265) 2931 Telex: J22908, J22152 CLARISHO
Overseas Sales Branch Offices:
CLARION SHOJI (EUROPA) G.m.b.H. Rudolf-Diesel-Strasse 2, 6236 Eschborn 2, West Germany Tel: 06173-61041-42 Telex: 415414
CLARION CORPORATION OF AMERICA 5500 Rosecrans Blvd.P.O.Box 749, Lawndale, Calif., 90260 U.S.A. Tel: 213-973-1100 Telex: CLARIONLSA 66-4447
CLARION (HONG KONG) CO., LTD, Rooms 333-335, Star House, 3, Salisbury Road, Tsimshatsui, Kowloon, Hong Kong Tel: 3-695393 Telex: SIERA HX74922



SPCIFICATIONS

AUDIO SECTION

Power output
Dynamic power (IHF):
125W (8Ω)
Continuous RMS power (each channel driven):
50W/50W (8Ω, at 1KHz)
Continuous RMS power (both channels driven):
45W+45W (8Ω, at 1KHz)
Continuous RMS power (both channels driven):
40W+40W
(8Ω, at 20Hz to 20KHz)
Total harmonic distortion
Power amplifier only:
0.1% (8Ω, at rated power)
Power amplifier only:
0.03% (8Ω, at 1W)
Overall (AUX to power output):
0.1% (8Ω, at rated power)
Intermodulation distortion (70Hz: 7KHz=4:1)
Power amplifier only:
0.1% (8Ω, at rated power)
Power amplifier only:
0.05% (8Ω, at 1W)
Overall (AUX to power output):
0.1% (8Ω, at rated power)
Power bandwidth (IHF)
5Hz to 50KHz
(T.H.D. 0.5% const.)
Load impedance (speakers & phones)
4Ω to 16Ω
Damping factor (8Ω)
70 (at 1KHz)
Frequency response (at 1W)
Overall (TUNER, AUX, TAPE PB to power output): 10Hz to 40KHz
(+0dB, −3dB)
Overall (MIC to power output):
70Hz to 10KHz
(+0dB, −3dB)
Power amplifier only:
5Hz to 150KHz
(+0dB, −3dB)

Printed in Japan 298-2065-00

MA-7800E

Deviation from RIAA:
30Hz to 15KHz (±0.5dB)

Channel separation (1KHz, at rated power)

Power amplifier only:
60dB
Overall from PHONO:
45dB
Overall from TUNER, AUX, TAPE PB:
45dB

Hum and noise (IHF, closed circuit A netword)

Overall from PHONO:
75dB
Overall from MIC: 75dB
Overall from TUNER, AUX, TAPE PB:
90dB
Power amplifier only:
100dB
Volume at minimum:
90dB

Input sensitivity and impedance (1KHz, at rated power)

PHONO 1: 2.3mV (50KΩ)
PHONO 2: 2.3mV (50KΩ)
PHONO max. input capability:
120mV (T.H.D. 0.1%)
MIC: 2.5mV (30KΩ)
MIC max. input capability:
120mV (T.H.D. 0.1%)
TUNER: 150mV (100KΩ)
AUX 1: 150mV (100KΩ)
AUX 2: 150mV (100KΩ)
TAPE PB 1 (Pin): 150mV (100KΩ)
TAPE PB 2 (Pin, DIN):
150mV (100KΩ)
Power amplifier input:
800mV (50KΩ)

Output level and impedance (1KHz, at rated power)

TAPE REC OUT 1 (Pin):
150mV (10KΩ)
TAPE REC OUT 2 (Pin):
150mV (10KΩ)
TAPE REC OUT 2 (DIN):
30mV (80KΩ)
PRE OUT: 800mV (27KΩ)

Tone controls

BASS turnover 500Hz:
±10dB (at 100Hz)
BASS turnover 250Hz:
±10dB (at 50Hz)
TREBLE turnover 2.5KHz:
±10dB (at 10KHz)
TREBLE turnover 5KHz:
±10dB (at 20KHz)

Filters

LOW: −3dB (at 70Hz, 6dB/oct.)
HIGH: −3dB (at 7KHz, 6dB/oct.)

Loudness (−30dB) +8dB (at 100Hz)
+4dB (at 10KHz)

GENERAL

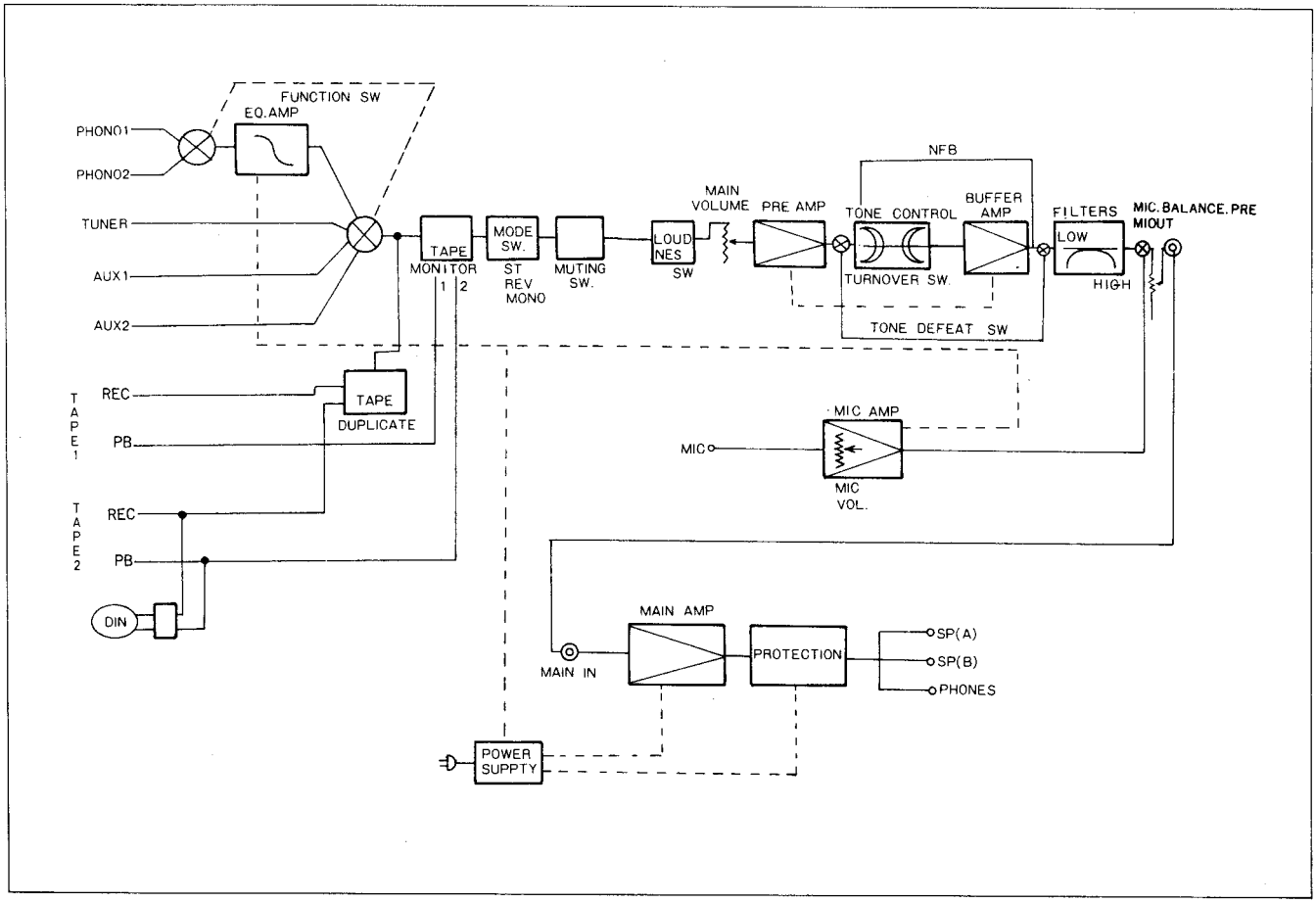
Semiconducters	1 IC, 29 transistors, 11 diodes
Power source	AC 220V 50Hz
Power consumption	220W
Dimensions	Height 207mm (8-5/32") Width 467mm (18-25/64") Depth 255mm (10-3/64")
Weight	10kg (22 lbs)

* Specifications and design are subject to modification without notice due to product improvement.

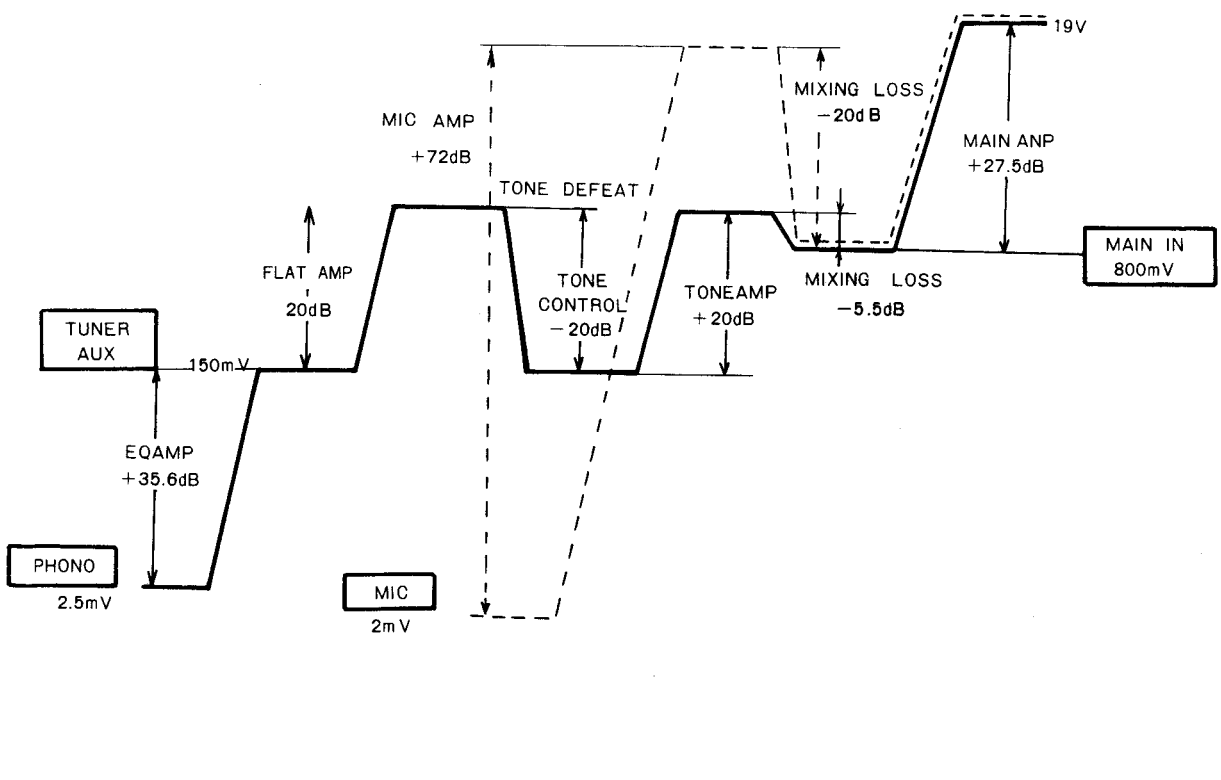
■FEATURES

- Pure complementary OCL power amplifier built-in.
- Superb equalizer circuit using high-performance IC.
  A high-performance, low-noise IC is used in the equalizer amplifier so that besides achieving RIAA equalization a dynamic record reproduction is obtained.
- Mic. mixing mechanism for additional pleasure.
  In addition to master Volume control a Mic. Amp. use Volume control is provided for background mixing with music source.
- Two systems of speaker can be used.
  Two sets of speaker system can always be used without changing connections of speaker cords.
- Built-in protection circuit.
  A protection circuit for eliminating shock sound when power is turned on and protecting the power transistors against damage when output (speaker cord, etc.) is shorted is built-in.
- Tone control circuit
  ①The tone control circuit employs NFB system.
  ②Tone control selection is possible by means of turnover frequency selector switch.
  ③Flat characteristic without using the tone control circuit can be instantly obtained by means of tone defeat switch.
- Tape Monitor and Duplicate switch.
  Tape monitor switch for 2 systems and duplicator switch are employed so that dubbing between tape monitor and tape deck can be accomlished.

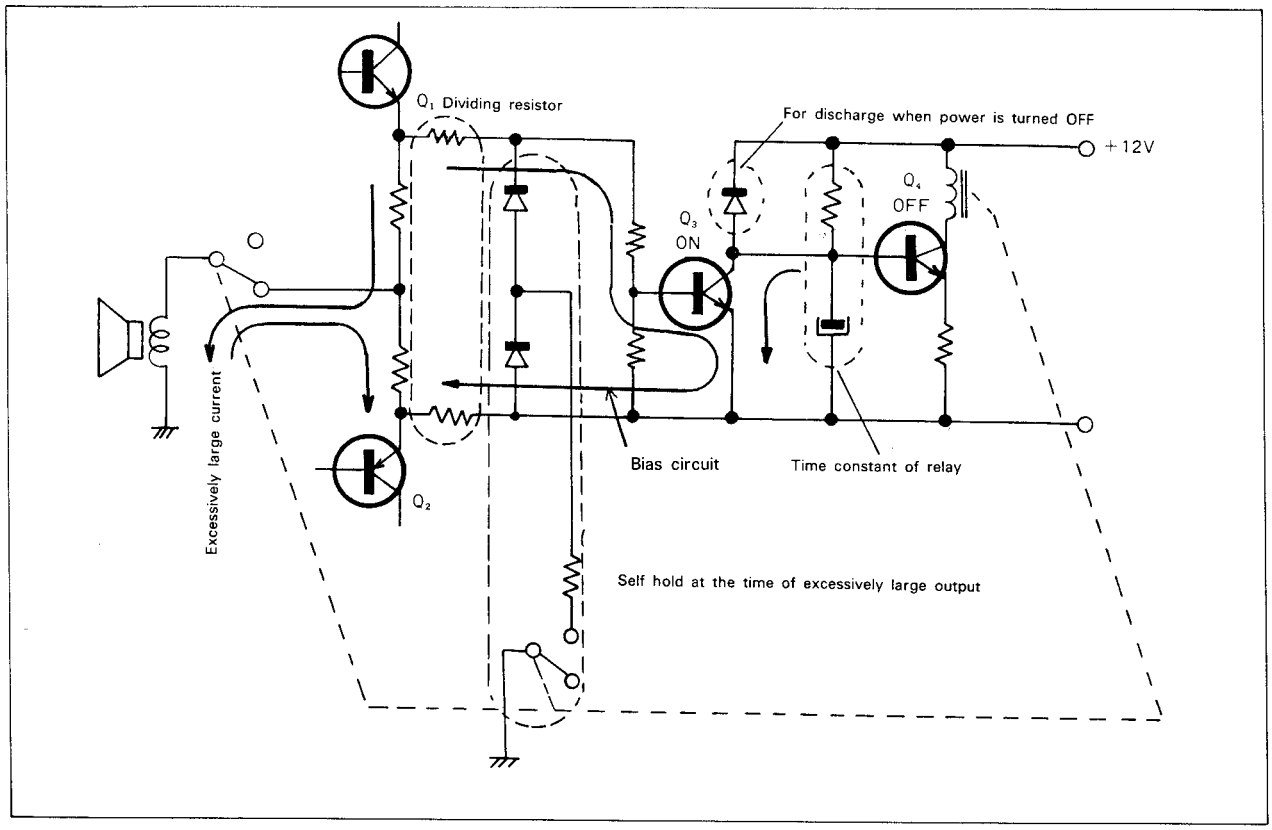
■BLOCK DIAGRAM



■LEVEL DIAGRAM



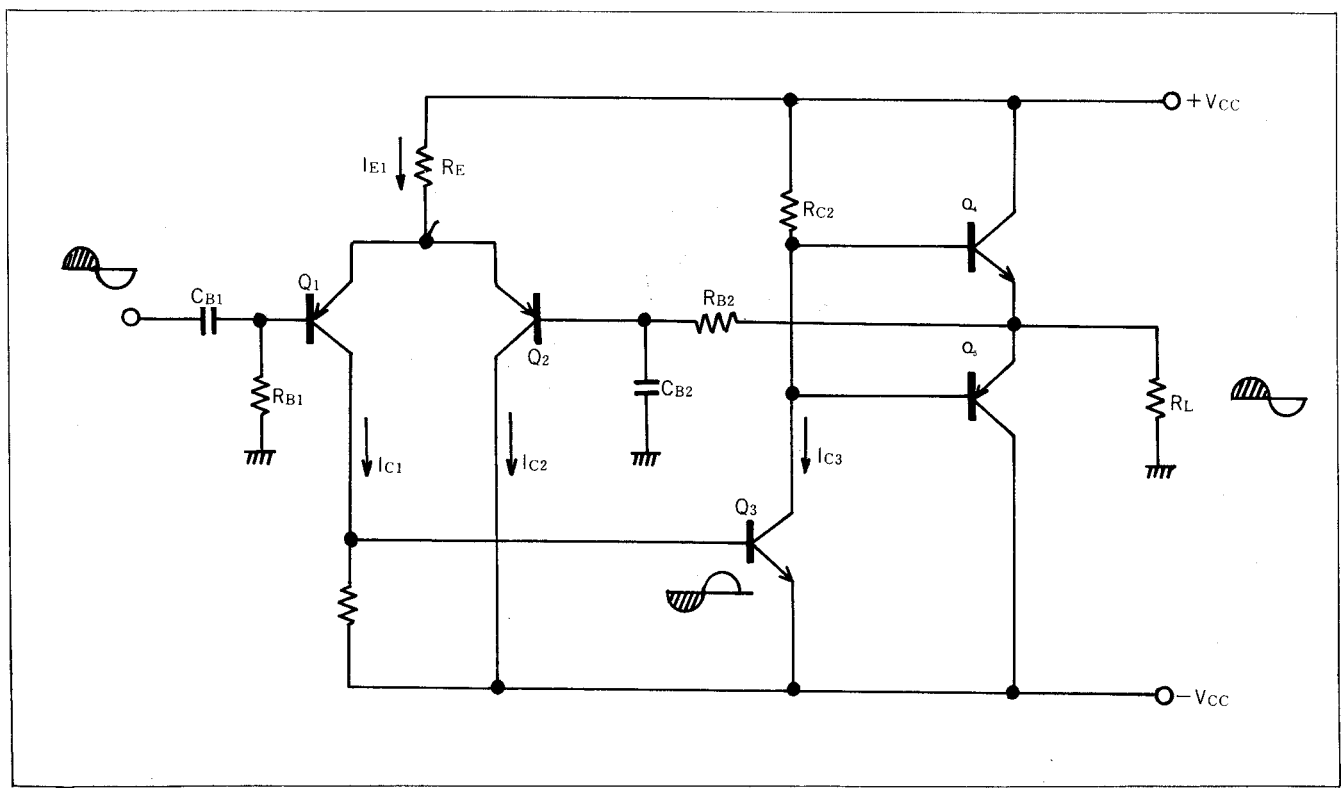
■PROTECTION CIRCUIT OPERATION



When exceedingly large current flows through speaker, bias current flows in Q3 and Q3 turns ON, potential of the base of Q4 becomes almost zero.

Therefore, Q4 turns OFF and at the same time the relay also turns OFF, output transistors (Q1, Q2) and speaker are separated and both are protected.

■POWER AMPLIFIER CIRCUIT OPERATION



Signal enters into the base of Q1 and appears at the base of Q3 in opposite phase.
Considering that negative half cycle signal enters into the base of Q3, positive half cycle appears at the collector of Q3 and enters into the base of Q4. Base potential of Q4 increases, collector current of Q4 increases, and positive half cycle is produced across R_L. At this time, Q5 becomes cutoff because it is NPN type. Conversely, when a positive half cycle signal enters into the base of Q3, current flows through collector of Q5 and a negative half cycle is produced across R_L.

[Regarding holding point (A) at zero potential]
Zero potential is necessary because if there is potential at point (A), continuous DC current flows through R_L (that is, voice coil of speaker), at the same time V_{BE} of Q4 and Q5 becomes unbalanced, and waveform distortion appears amplified across R_L.

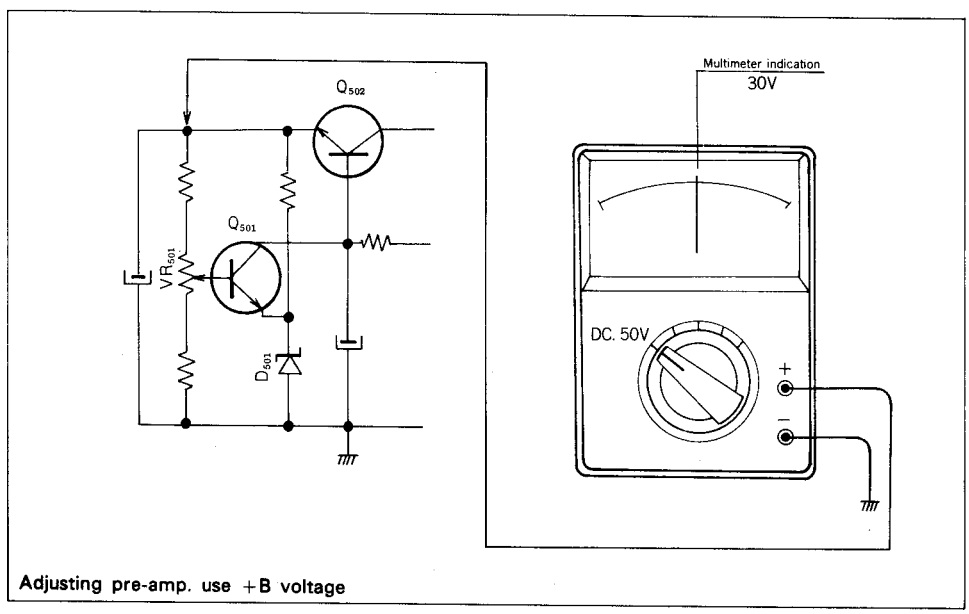
When somehow potential of point (A) decreases -ve potential), base potential of Q2 decreases, collector current I_{C2} of Q2 increases, and I_{C1} decreases.
(This is because $I_E = I_{C1} + I_{C2}$). Voltage drop across R_{C1} decreases and bias of Q3 also decreases. I_{C3} decreases, bias of Q4 increases, and potential of point (A) increases.
Conversely, when somehow potential of point (A) increases, base potential of Q2 increases, I_{C2} decreases and I_{C1} increases. Voltage drop across R_{C1} increases and bias of Q3 increases.
I_{C3} increases, bias of Q5 increases, and bias of Q4 decreases, and potential of point (A) decreases. In this way potential at point (A) is always maintained zero.

■ADJUSTMENT PROCEDURE

1. Adjustment of pre-amplifier use +B voltage

①Connect positive lead of multimeter to +B terminal of power supply PWB and minus lead to the ground side of solid resistor R½W 4.7KΩ.

②Adjust by turning the semifixed potentiometer VR501 (012-2700-00) with a screwdriver so that deflection in the mutimeter becomes 30V.



Adjusting pre-amp. use +B voltage

2. Adjusting idling current of power transistors

1. Verify that there is no signal.
2. Remove fuse 2 and connect a multimeter to the terminals of the fuse holder.
3. Adjust the power transistors idling current adjusting VR (right CH) VR201 so that deflection in the multimeter becomes 20 ~ 25 mA.
   After completing adjustment of right CH insert fuse 2.
4. Remove fuse 1 and connect the multimeter to the terminals of the fuse holder.
5. Adjust the power transistors idling current adjusting VR (left CH) VR101 so that deflection in the multimeter becomes 20 ~ 25 mA.

■TROUBLESHOOTING (Refer to circuit diagram, actual wiring diagram, explded view)

Check point	DC.V	Contents
CP_1	12.7V	Protection power supply voltage
CP_2	1.2V	Protector circuit
CP_3	1.3V	Protector circuit
CP_4	—	Protector circuit
CP_5	±36V	Main-amp power supply voltage
CP_6	±36V	Main-amp power supply voltage
CP_7	−1.0V	Main-amp circuit
CP_8	—	
CP_9	0.66V	Main-amp circuit
CP_{10}	39V	Regulated power supply circuit
CP_{11}	30V	Regulated power supply circuit
CP_{12}	30V	Pre-amp power supply voltage
CP_{13}	12.2V	Tone-amp circuit
CP_{14}	10.4V	Tone-amp circuit
CP_{15}	27.6V	Tone-amp circuit
CP_{16}	26V	Tone-amp circuit
CP_{17}	12.2V	Tone-amp circuit
CP_{18}	3.2V	Tone-amp circuit
CP_{19}	18.5V	Tone-amp circuit
CP_{20}	13.6V	Tone-amp circuit
CP_{21}	0V	Equalizer-amp circuit
CP_{22}	13.7V	Equalizer-amp circuit

Check point	DC.V	Contents
CP_{23}	26.1V	Equalizer-amp circuit
CP_{24}	26.6V	Equalizer-amp circuit
CP_{25}	13.7V	Equalizer-amp circuit
CP_{26}	13.2V	Equalizer-amp circuit
CP_{27}	13.5V	Equalizer-amp circuit
CP_{28}	28.5V	Mic-amp power supply voltage
CP_{29}	15V	Mic-amp output
CP_{30}	2.65V	Mic-amp circuit
CP_{31}	2.2V	Mic-amp circuit
CP_{32}	—	Mic-amp circuit
CP_{33}	0.05V	Mic-amp circuit
CP_{34}	5.7V	Mic-amp circuit
CP_{35}	0.5V	Mic-amp circuit
CP_{36}	0.45V	Mic-amp circuit
CP_{37}	—	Main-amp input
CP_{38}	—	Tone-amp circuit
CP_{39}	—	Tone-amp input
CP_{40}	—	Equalizer output
CP_{41}	—	Phono input
CP_{42}	—	Mic V.R output
CP_{43}	—	Mic-amp input

※First of all check if there is no faulty soldering, any connector is not loose or disconnected, or pre-main connecting plug is securely connected or not.

※Except Mic. Amp. power supply circuit, only L.CH indicates.

■No sound at all

NOTE) CP_1,CP_2,CP_3,CP_4 voltage : 13V line voltage with respect to ground

A. Voltage check

(A) Power supply section and power section

a) Power lamp is not lighting

CP_1(12.7V)—NG—Power switch faulty
power fuse blown
Power transformer open
(primary side or 11V)
D_{405} open
C_{402} short
—OK—PL faulty

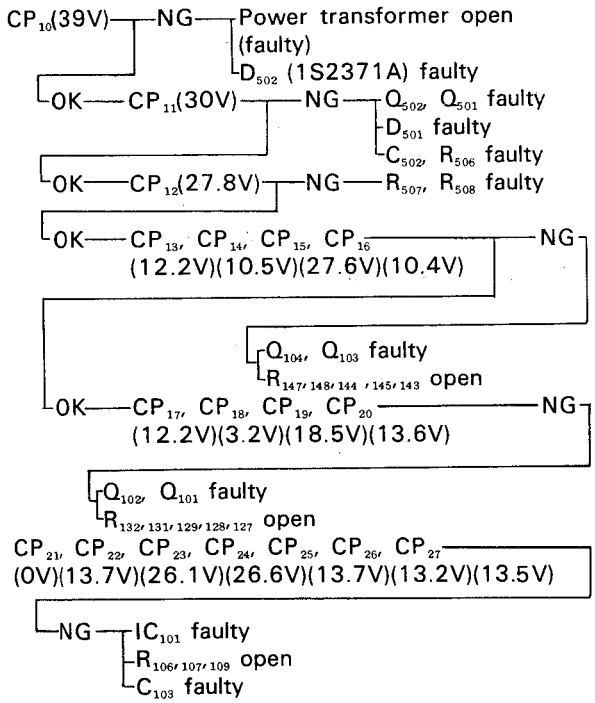
b) Protection lamp is lighting

CP_2(1.2V)—NG—Relay faulty
—OK—CP_3(1.3V)—NG—Q_{402} faulty
R_{407} open
—OK—CP_4(0V)—NG—Q_{11}, Q_{111} faulty
Speaker short
—OK—Q_{401} faulty
R_{406} open
C_{401} short

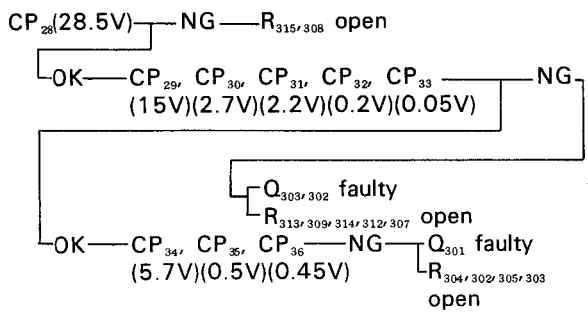
c) Protection lamp is off, relay makes contact but there is no sound

CP_2(1.2V)—NG—Relay faulty
—OK—Protection lamp open
—CP_5($\begin{matrix}+36V\\-36V\end{matrix}$)—NG—Power transformer open
D_{406}, D_{407} open
—OK—CP_6($\begin{matrix}+36V\\-36V\end{matrix}$)—NG—Protecting fuse blown
—OK—CP_7(−1V)—NG—R_{161}, R_{162} open
Q_{108}, Q_{110} faulty
Q_{109}, Q_{111} faulty
—OK—CP_8(−35V)—NG—Q_{105}, Q_{106} faulty
R_{156} faulty
Q_{107} faulty
C_{131} short
—OK—CP_9(0.6V)—NG—R_{157}, R_{160} open
C_{128} faulty
—OK—C_{129}, R_{154} open
C_{127}, R_{153} faulty

(B) Tone and equalizer section

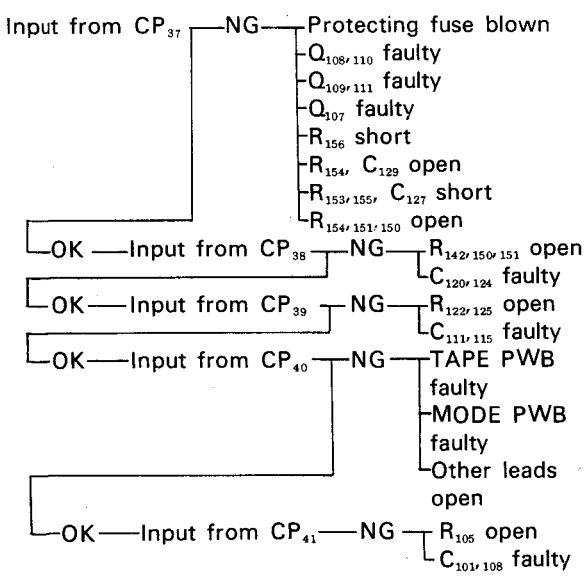


(C) Mic. Amp. section.

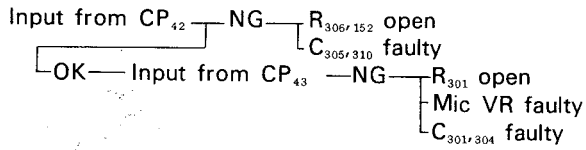


B. Signal circuit check

(A) Feed signal from oscillator and check at SP terminal.



(B) Mic. Amp. check.



■Sound volume is low

Perform the following checks after verifeing that normal voltage is being applied to each transistor.

Main Amp.
- C_{130} faulty
- Q_{108} faulty

Tone Amp.
- $C_{112, 114, 122}$ faulty

Equalizer Amp.
- $R_{109, 111, 110, 112}$ faulty
- $C_{104, 105}$ faulty
- $C_{101, 108}$ faulty

Mic. Amp.
- $C_{301, 305, 310}$ faulty
- $R_{152, 301, 306}$ faulty

■Low, high tones absent

Tone Amp.
- $C_{111, 115, 120, 124}$ faulty
- $C_{112, 114, 122}$ faulty

Equalizer Amp.
- $R_{110, 111, 112, 104, 105}$ faulty

■Sound is distorted

Power Amp.
- Q_{106} faulty
- D_{101} open

Tone Amp.
- $R_{136, 141}$ faulty

Equalizer Amp.
- IC_{101} faulty
- $C_{106, 107}$ faulty

Mic. Amp.
- $R_{310, 390}$ faulty
- C_{308} faulty

■Oscillates

Power Amp.
- R_{167}, $C_{133, 131}$ open

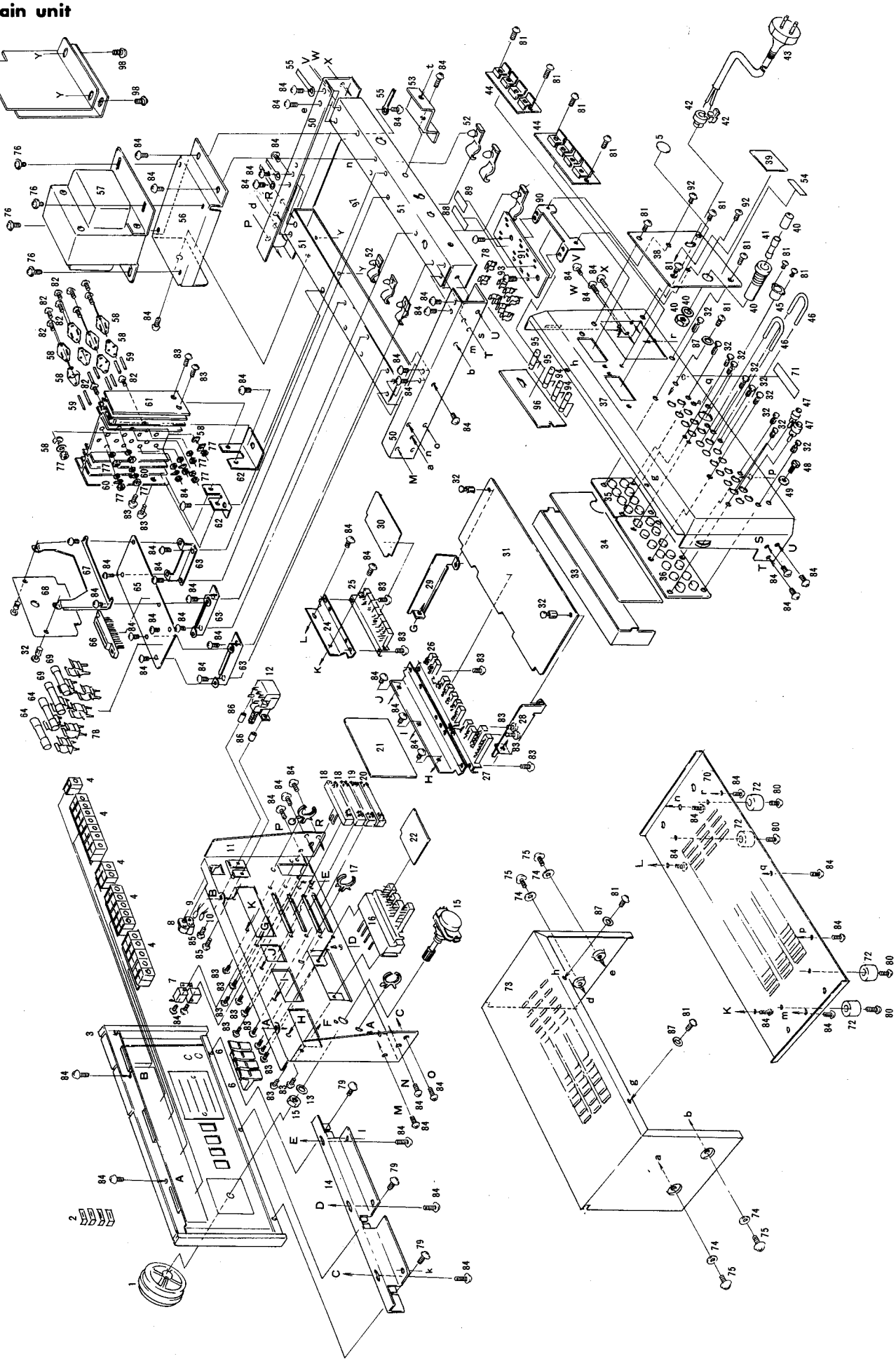
Tone Amp.
- $C_{113, 121, 123}$ faulty

Equalizer Amp.
- $C_{106, 104, 105}$ faulty
- $R_{109, 106, 107, 110, 111, 112}$ open

Mic. Amp.
- $C_{307, 306, 304}$ faulty

■EXPLODED VIEW

⊙Main unit



■PARTS LIST:

⊙Main unit

REF.NO.	PART NO.	DESCRIPTION	RANK
1	380-3563-01	Knob	2
2	380-3564-00	Knob	2
3	940-2333-01	Escutcheon ass'y	
4	382-0104-02	Button	2
5	290-2907-00	Label	
6	380-3562-00	Knob	2
7	075-0109-00	Jack	
8	345-2666-00	Rubber part	
9	017-0334-00	Pilotlamp	1
10	017-0334-01	Pilotlamp	1
11	309-0275-01	Front plate	
12	013-3317-00	Switch	2
13	745-0310-00	Special washer	
14	330-5821-00	Pressed part	
15	012-3474-00	Variable resistor	2
16	013-3256-00	Switch	2
17	335-0787-00	Molded part	
18	012-3476-00	Variable resistor	2
19	012-3510-00	Variable resistor	2
20	012-3475-00	Variable resistor	2
21	099-4531-01	PWB	
22	099-4529-00	PWB	
23	330-5814-00	Pressed part	
24	330-5815-00	Pressed part	
25	013-3253-00	Switch	2
26	013-3254-00	Switch	2
27	013-3252-00	Switch	2
28	330-5813-01	Pressed part	
29	330-5813-00	Pressed part	
30	099-4530-01	PWB	
31	099-4528-01	PWB	
32	335-0779-00	Molded part	
33	330-5820-00	Pressed part	
34	099-4527-01	PWB	
35	075-0108-00	Jack	
36	075-0100-02	Jack	
37	307-0255-22	Rear cover	
38	307-0257-08	Rear cover	
39	286-4004-00	Set plate	
40	007-0074-00	Fuse receptacle	
41	121-1600-10	Fuse (1.6AT)	1
42	335-0725-00	Molded part	
43	850-1959-01	A-lead	
44	073-0509-00	Terminal	
45	074-0480-00	Outlet socket	
46	076-0118-00	Plug	
47	076-0095-02	Plug	
48	710-4010-22	Hexagon bolt	

REF.NO.	PART NO.	DESCRIPTION	RANK
49	740-4000-12	Flut washer	
50	312-0154-02	Chassis	
51	312-0155-00	Chassis	
52	335-0814-00	Molded part	
53	330-5818-00	Pressed part	
54	287-1364-00	Name plate	
55	321-0809-00	Clamp	
56	330-5816-01	Pressed part	
57	008-0679-00	Power trans	3
58		Transistor	
59	825-0197-00	Special tube	
60	073-0210-01	Terminal	
61	313-0933-00	Heat sink	
62	330-5817-00	Pressed part	
63	330-5808-00	Pressed part	
64	121-2000-10	Fuse (2AT)	1
65	099-4533-03	PWB	
66	074-0514-01	Outlet socket	
67	330-5819-00	Pressed part	
68	099-4532-01	PWB	
69	121-2500-10	Fuse (2.5AT)	1
70	311-0890-00	Lower case	
71	347-0337-00	Paper part	
72	335-0805-00	Molded part	
73	310-0857-00	Upper case	
74	746-0592-00	Special washer	
75	714-4006-76	Machine screw (M4x6)	
76	735-4010-11	D-sems-screw (M4x10)	
77	722-0320-00	Special nut	
78	077-0076-00	Fuse receptacle	
79	737-3006-11	Sems screw(M3x6)	
80	714-3020-81	Machine screw (M3x20)	
81	702-3008-89	Tap screw(M3x8)	
82	714-3014-11	Machine screw (M3x14)	
83	714-3006-11	Machine screw (M3x6)	
84	702-3008-81	Tap screw(M3x8)	
85	714-3008-11	Machine screw (M3x8)	
86	340-0405-00	Spacer	
87	746-0660-00	Special washer	
88	287-1314-05	Name plate	
89	287-1363-00	Name plate	
90	330-5912-01	Pressed part	
91	099-4912-00	PWB	
92	714-3006-89	Machine screw (M3x6)	
93	714-3006-81	Machine screw (M3x6)	
94	121-5000-10	Fuse (5AT)	1
95	121-0315-10	Fuse (315mAT)	1
96	347-0706-00	Paper part	
97	330-6439-00	Pressed part	
98	702-3010-81	Tap screw	

■ELECTRICAL PARTS

⊙EQ-TONE-AMP P.W.B

REF.NO.	PART NO	DESCRIPTION
$Q_{101,103,104}^{201,203,204}$	100-0493-28	Transistor(2SC493GR)
$Q_{102,202}$	102-1000-28	Transistor(2SC1000GR)
IC_{101}	051-0054-00	IC
S_1	013-3252-00	Switch
S_6	013-3254-00	Switch
$C_{104,204}$	141-2221-12	Polyester capacitor (50V0.0022μF)
$C_{105,205}$	141-8221-12	Polyester capacitor (50V0.0082μF)
$C_{107,207}$	141-1022-12	Polyester capacitor (50V0.001μF)
$C_{117}^{116,216,217}$	141-1522-12	Polyester capacitor (50V0.0015μF)
$C_{219}^{118,119,218}$	141-2232-13	Polyester capacitor (50V0.022μF)
$C_{110,210}$	141-3332-13	Polyester capacitor (50V0.033μF)
$C_{125,225}$	141-2732-13	Polyester capacitor (50V0.027μF)
$C_{221,121}$	144-1002-12	Mica capacitor (50V10PF)
$C_{223}^{113,123,213}$	144-3302-12	Mica capacitor (50V33PF)
$C_{109,209}$	144-2012-15	Mica capacitor (50V200PF)
$C_{106,206}$	144-2412-17	Mica capacitor (50V240PF)
$C_{136,236}$	144-1512-14	Mica capacitor (50V150PF)
$C_{126,226}$	148-3341-12	ML capacitor (50V0.33μF)
$C_{114,214}$	180-4764-22	Electrolytic capacitor (10V47μF)
$C_{112,212}$	180-4764-42	Electrolytic capacitor (25V47μF)
$C_{208,222}^{108,122}$	180-1064-52	Electrolytic capacitor (35V10μF)
$C_{507,505,506}$	180-1074-52	Electrolytic capacitor (35V100μF)
$C_{102,202}$	180-2274-32	Electrolytic capacitor (16V220μF)
$C_{120,220}^{101,201}$	181-2253-62	Electrolytic capacitor (50V2.2μF)
$C_{111,211}$	042-0184-02	Special capacitor (35V0.22μF)
$C_{115,215}$	181-4753-62	Electrolytic capacitor (50V4.7μF)
$C_{103,203}$	181-1063-62	Electrolytic capacitor (50V10μF)
R_{509}	110-3311-41	Solid resistor (½W330Ω)
$R_{507,508}$	110-1511-41	Solid resistor (½W150Ω)

REF.NO.	PART NO	DESCRIPTION
$R_{133,233}$	111-1211-33	(Film resistor (¼W120Ω)
$R_{145,245}^{109,209}$	111-5611-33	(Film resistor (¼W560Ω)
$R_{147,247}^{134,234}$	111-8211-33	(Film resistor (¼W820Ω)
$R_{225,235,236}^{125,135,136}$	111-1021-33	(Film resistor (¼W1KΩ)
$R_{111,211}^{105,205}$	111-2221-33	(Film resistor (¼W2.2KΩ)
$R_{142,242}$	111-2721-33	(Film resistor (¼W2.7KΩ)
$R_{138,238}$	111-3321-33	(Film resistor (¼W3.3KΩ)
$R_{144,244}$	111-4721-33	(Film resistor (¼W4.7KΩ)
$R_{232,248,270}^{132,148,170}$	111-6821-33	(Film resistor (¼W6.8KΩ)
$R_{223,228,231}^{123,128,131}$	111-1231-33	(Film resistor (¼W12KΩ)
$R_{230,299,241}^{130,139,141}$	111-1831-33	(Film resistor (¼W18KΩ)
$R_{113,213}^{107,207}$	111-2231-33	(Film resistor (¼W22KΩ)
$R_{110,210}$	111-3031-33	(Film resistor (¼W30KΩ)
$R_{149,249}^{146,246}$	111-5631-33	(Film resistor (¼W56KΩ)
$R_{106,206}$	111-8231-33	(Film resistor (¼W82KΩ)
$R_{122,222}$	111-1041-33	(Film resistor (¼W100KΩ)
$R_{143,243}$	111-1541-33	(Film resistor (¼W150KΩ)
$R_{126,226}$	111-2741-33	(Film resistor (¼W270KΩ)
$R_{112,212}$	111-3341-33	(Film resistor (¼W330KΩ)
$R_{127,227}$	111-4741-33	(Film resistor (¼W470KΩ)
$R_{140,240}^{137,237}$	111-1051-33	(Film resistor (¼W1MΩ)
$R_{208,224,229}^{108,124,129}$	111-1531-33	(Film resistor (¼W15KΩ)
$R_{104,204}$	111-2241-33	(Film resistor (¼W220KΩ)
$R_{129,229}$	111-9111-33	(Film resistor (¼W910Ω)
	076-0137-06	Plug(6P)
	076-0137-08	Plug(8P)
	076-0137-12	Plug(12P)
	076-0137-03	Plug(3P)

⊙MAIN AMP P.W.B

REF.NO.	PART NO	DESCRIPTION
$Q_{109,209}$	100-0815-25	Transistor (2SA815Y)
$Q_{105,205}^{106,206}$	100-0841-28	Transistor (2SA841GR)
$Q_{108,208}$	102-1625-25	Transistor (2SC1625Y)
$Q_{107,207}$	102-1628-25	Transistor (2SC1628Y)
$D_{101,201}$	001-0138-00	Diode (STV3H-0)
$C_{133,233}$	141-1532-13	Polyester capacitor (50V0.015μF)
$C_{135,235}^{134,234}$	141-1042-15	Polyester capacitor (50V0.1μF)
$C_{131,231}$	144-4702-12	Mica capacitor (50V47PF)
$C_{127,227}$	144-1012-14	Mica capacitor (50V100PF)
$C_{129,229}$	180-1064-22	Electrolytic capacitor (10V10μF)
$C_{128,228}$	180-4764-52	Electrolytic capacitor (35V47μF)
$C_{132,232}^{130,230}$	180-4764-02	Electrolytic capacitor (50V47μF)
$R_{166,266}^{163,362}$	110-1001-41	Solid resistor (½W10Ω)

REF.NO.	PART NO	DESCRIPTION
$R_{165,265}^{164,264}$	110-2211-41	Solid resistor (½W220Ω)
$R_{158,258}$	111-2221-33	Film resistor (¼W2.2KΩ)
$R_{167,260}$	111-1001-33	Film resistor (¼W10Ω)
$R_{156,256}$	111-1021-33	Film resistor (¼W1KΩ)
$R_{161,261}^{154,254}$	111-2721-33	Film resistor (¼W2.7KΩ)
$R_{160,260}$	111-4721-33	Film resistor (¼W4.7KΩ)
$R_{162,262}$	111-5621-33	Film resistor (¼W5.6KΩ)
$R_{157,257}$	111-2231-33	Film resistor (¼W22KΩ)
$R_{159,259}^{155,255}$	111-5631-33	Film resistor (¼W56KΩ)
$R_{171,271}$	111-3011-33	Film resistor (¼W300Ω)
$R_{153,253}$	111-4741-33	Film resistor (¼W470KΩ)
$VR_{101,201}$	012-3364-00	Variable resistor

⊙POWER SUPPLY P.W.B

REF.NO.	PART NO	DESCRIPTION
Q_{401}	102-0373-00	Transistor(2SC373)
Q_{502}	102-0495-25	Transistor(2SC495Y)
Q_{501}	102-0734-25	Transistor(2SC734Y)
Q_{402}	102-0732-25	Transistor(2SC732Y)
$D_{401,402,403}$	001-0010-00	Diode(1N34A)
$D_{404,405}$	001-0077-00	Diode(10D4)
D_{501}	001-0099-01	Diode(HZ7B)
D_{406}	001-0171-00	Diode(S5VB20)
D_{502}	001-0141-00	Diode(1S2371A)
VR_{501}	012-2700-00	Variable resistor
	014-0424-00	Relay
	076-0137-03	Plug (3P)
	076-0137-08	Plug (8P)
C_{401}	180-1084-12	Electrolytic capacitor (6.3V1000μF)
C_{503}	180-2274-62	Electrolytic capacitor (50V220μF)
C_{402}	180-3374-32	Electrolytic capacitor (16V330μF)
C_{502}	180-1074-52	Electrolytic capacitor (35V100μF)

REF.NO.	PART NO	DESCRIPTION
C_{501}	180-2274-52	Electrolytic capacitor (35V220μF)
C_{504}	180-3374-62	Electrolytic capacitor (50V330μF)
$C_{403,404}$	042-0209-00	Special capacitor (50V6800μF)
R_{506}	110-3301-41	Solid resistor (½W33Ω)
$R_{405,409}$	110-4721-41	Solid resistor (½W4.7KΩ)
R_{407}	111-3991-33	Film resistor (¼W3.9Ω)
R_{502}	111-1021-33	Film resistor (¼W1KΩ)
R_{505}	111-2721-33	Film resistor (¼W2.7KΩ)
R_{503}	111-4721-33	Film resistor (¼W4.7KΩ)
$R_{501,403,402,403,404}$	111-5621-33	Film resistor (¼W5.6KΩ)
R_{405}	111-3031-33	Film resistor (¼W30KΩ)
R_{406}	111-2731-33	Film resistor (¼W27KΩ)
$R_{169,168,269,268}$	032-0038-00	Special resistor (3W0.47Ω)
R_{504}	111-1821-33	Film resistor (¼W1.8KΩ)
R_{411}	111-1531-33	Film resistor (¼W15KΩ)
R_{410}	111-1831-33	Film resistor (¼W18KΩ)
C_{407}	141-1532-13	Polyester capacitor (50V0.015μF)

⊙MIC AMP P.W.B

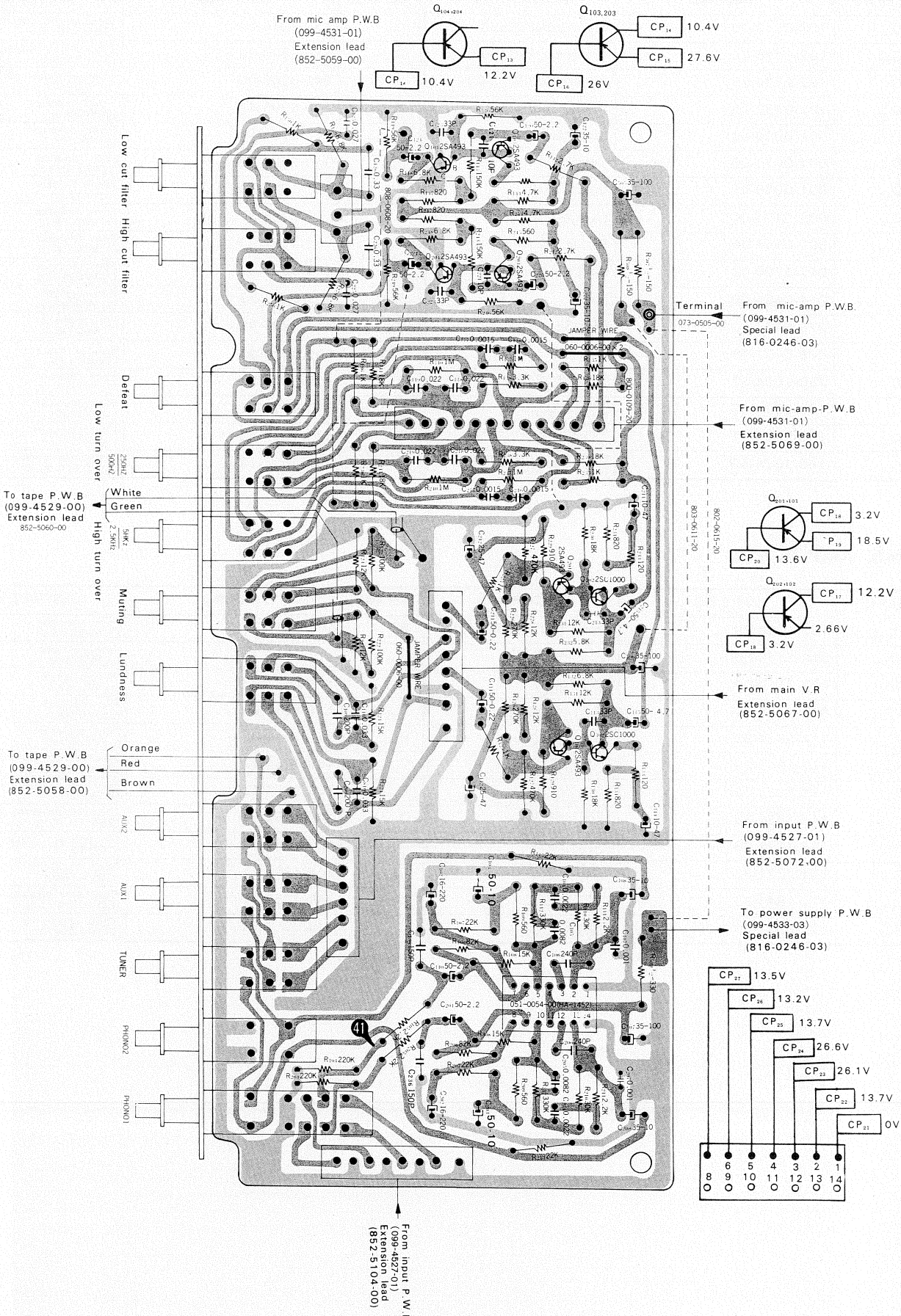
REF.NO.	PART NO	DESCRIPTION
$Q_{301,302,303}$	102-1000-28	Transistor(2SC1000GR)
VR_{301}	012-3475-00	Variable resistor (MIC)
VR_{302}	012-3510-00	Variable resistor (BALANCE)
$VR_{303,304}$	012-3476-00	Variable resistor (BASS, TREBLE)
$R_{301,306}$	111-3321-33	Film resistor (¼W3.3KΩ)
R_{302}	111-8241-33	Film resistor (¼W820KΩ)
R_{303}	111-3331-33	Film resistor (¼W33KΩ)
R_{304}	111-4731-33	Film resistor (¼W47KΩ)
R_{305}	111-1021-33	Film resistor (¼W1KΩ)
R_{308}	111-2221-33	Film resistor (¼W2.2KΩ)
$R_{307,309}$	111-1841-33	Film resistor (¼W180KΩ)
R_{310}	111-6831-33	Film resistor (¼W68KΩ)

REF.NO.	PART NO	DESCRIPTION
R_{311}	111-3941-33	Film resistor (¼W390KΩ)
R_{312}	111-3911-33	Film resistor (¼W390Ω)
R_{313}	111-5621-33	Film resistor (¼W5.6KΩ)
R_{314}	111-8211-33	Film resistor (¼W820Ω)
R_{315}	111-1511-33	Film resistor (¼W150Ω)
C_{301}	180-4754-52	Electrolytic capacitor (35V4.7μF)
C_{303}	180-1074-52	Electrolytic capacitor (35V100μF)
$C_{308,310}$	180-1064-52	Electrolytic capacitor (35V10μF)
C_{309}	180-4764-22	Electrolytic capacitor (10V47μF)
$C_{302,306}$	144-4702-12	Mica capacitor (50V47PF)
$C_{304,305}$	141-4732-14	Polyester capacitor (50V0.047μF)
C_{307}	144-2012-15	Mica capacitor (50V200PF)

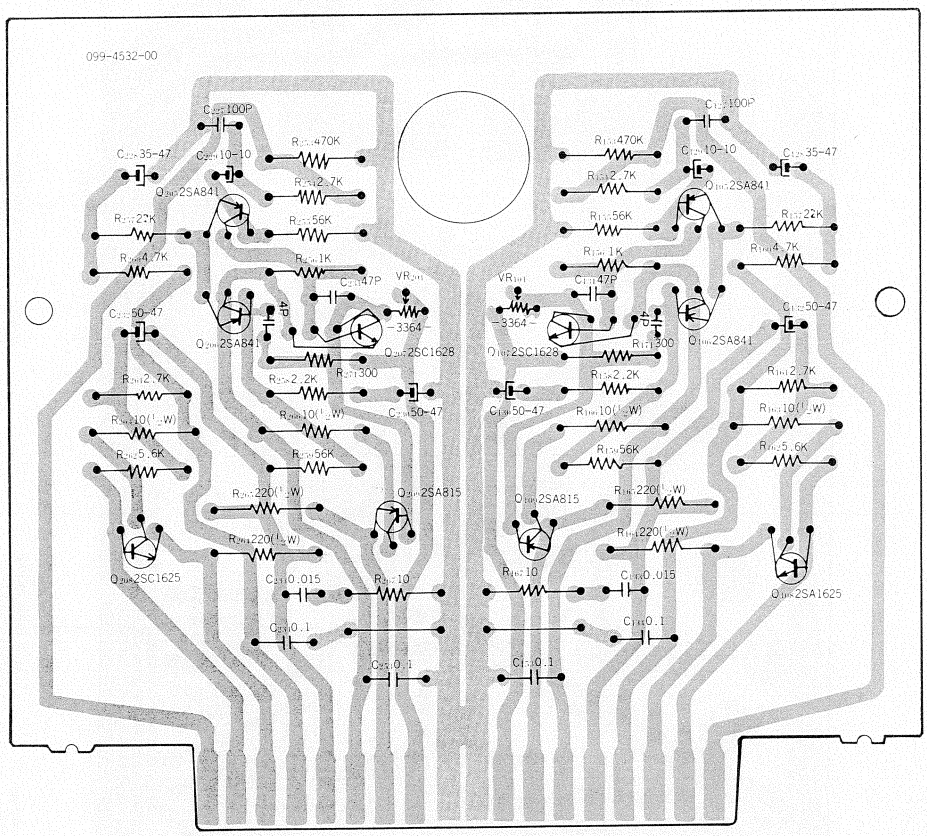
PRINTED WIRING BOARD

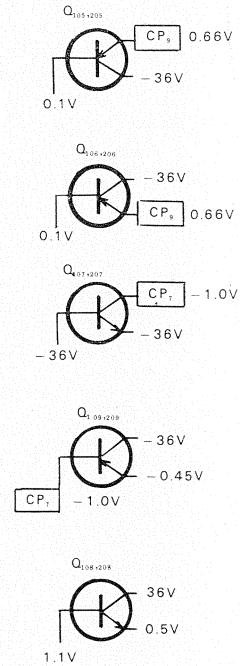
⊙EQ. TONE AMP P.W.B

● Mark is for check point

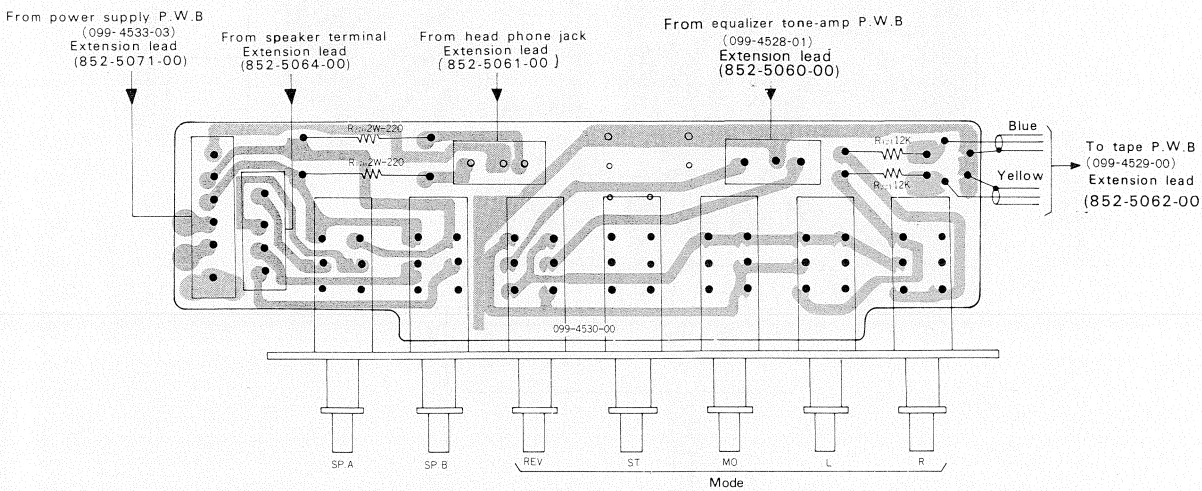


⊙MAIN AMP P.W.B ◀MA-7800G▶



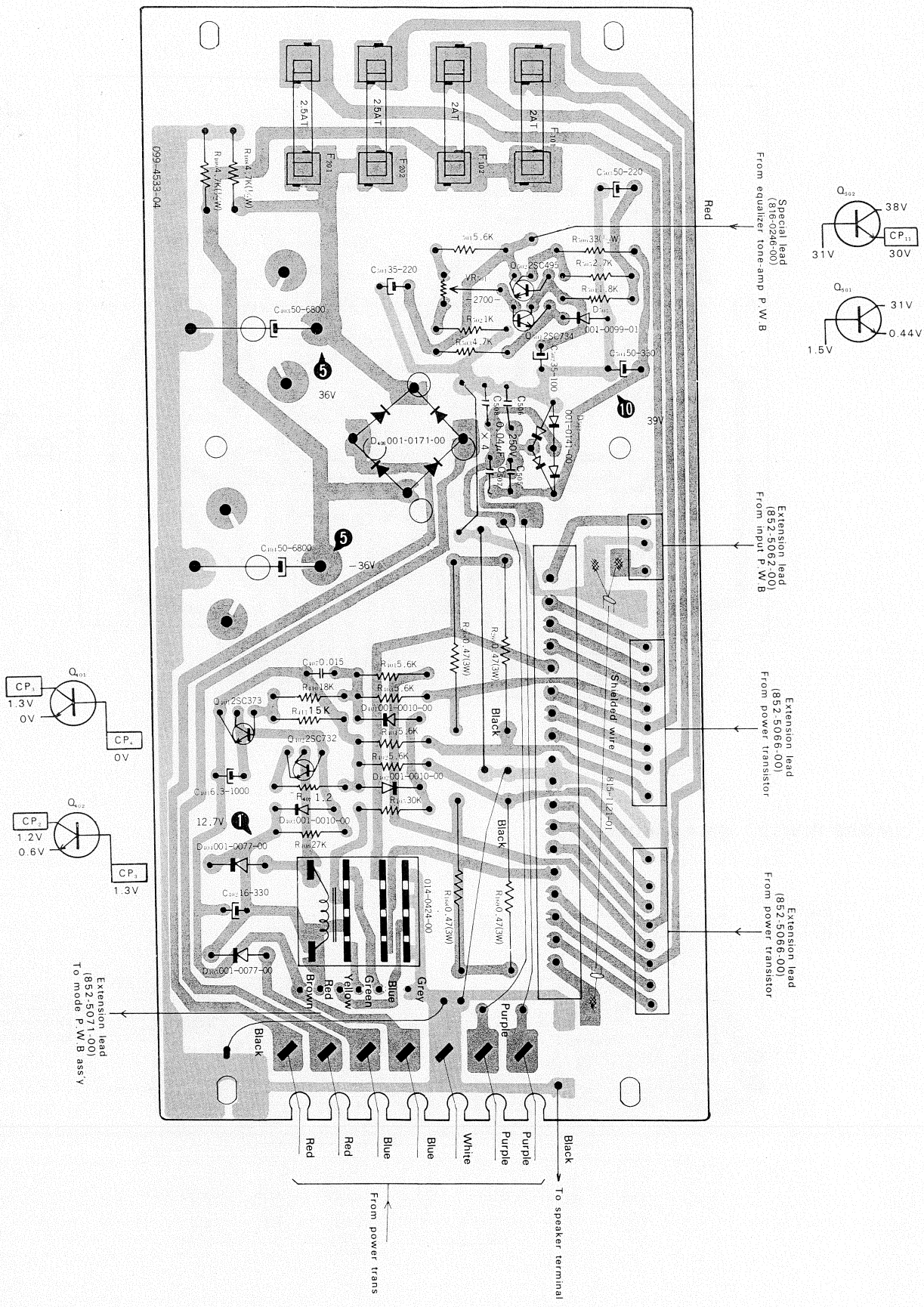


⊙MODE P.W.B ◀MA-7800G▶

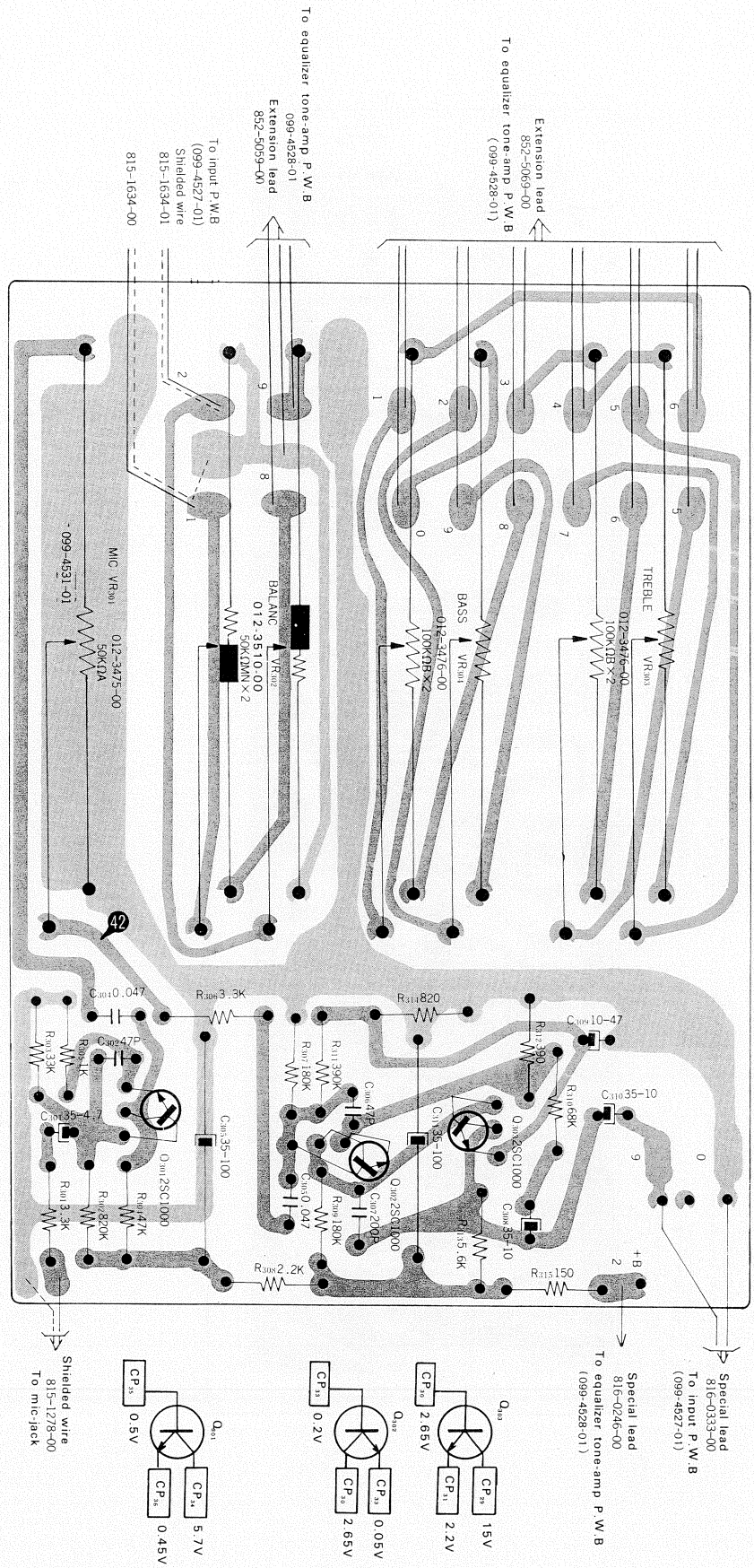


⊙POWER SUPPLY P.W.B

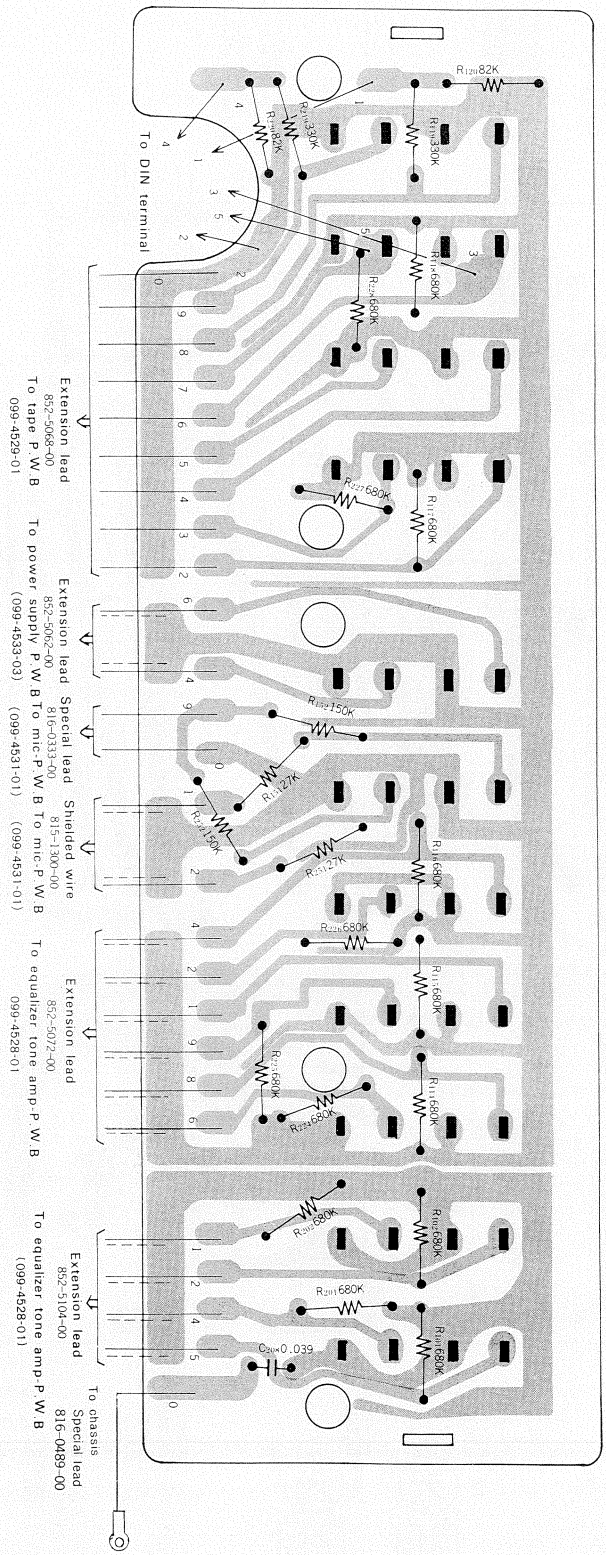
● Mark is for check point



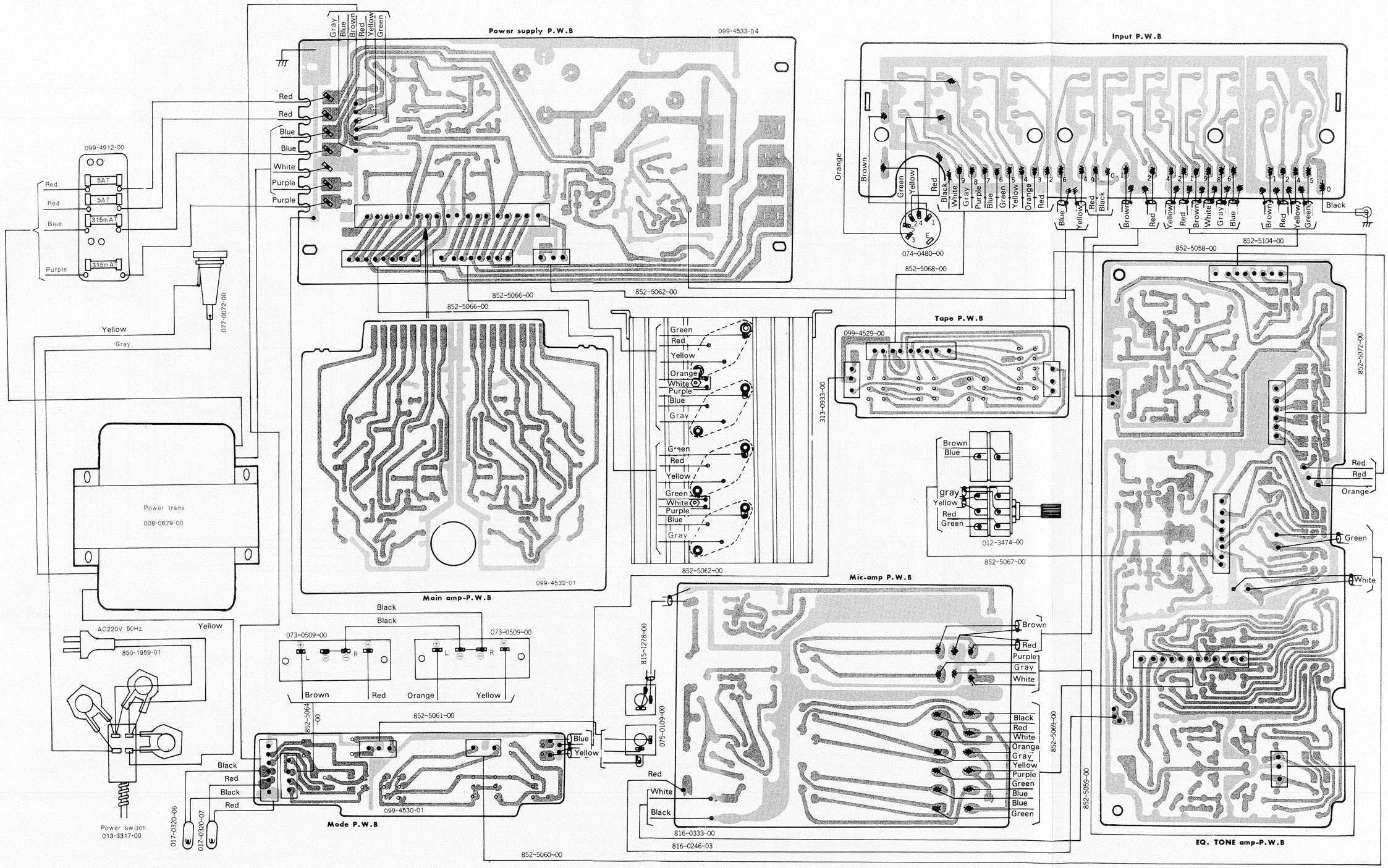
⊙MIC AMP P.W.B


Extension lead
852-5069-00
To equalizer tone-amp P.W.B
(099-4528-01)
To equalizer tone-amp P.W.B
099-4528-01
Extension lead
852-5059-00
To input P.W.B
(099-4527-01)
Shielded wire
815-1634-01
815-1634-00
099-4531-01
MIC VR301
012-3475-00
50KΩA
BALANCE
012-3510-00
50KΩMN×2
BASS
012-3476-00
100KΩB×2
TREBLE
012-3476-00
100KΩB×2
42
C304 0.047
R306 3.3K
R311 820
C309 10-47
R313 390
R310 68K
C310 35-10
C308 35-10
R315 5.6K
R315 150
+B
R305 1K
C305 35-100
R307 180K
R311 390K
C306 47P
C307 200P
R309 180K
C303 0.047
R308 2.2K
C302 47P
C301 35-4.7
R303 3.3K
R301 3.3K
R302 820K
R304 47K
Q301 2SC1000
Q302 2SC1000
Q303
CP29 15V
CP31 2.2V
CP30 2.65V
Q307
CP33 0.05V
CP32 2.65V
CP33 0.2V
Q301
CP34 5.7V
CP36 0.45V
CP35 0.5V
Special lead
816-0333-00
To input P.W.B
(099-4527-01)
Special lead
816-0246-00
To equalizer tone-amp P.W.B
(099-4528-01)
Shielded wire
815-1278-00
To mic jack

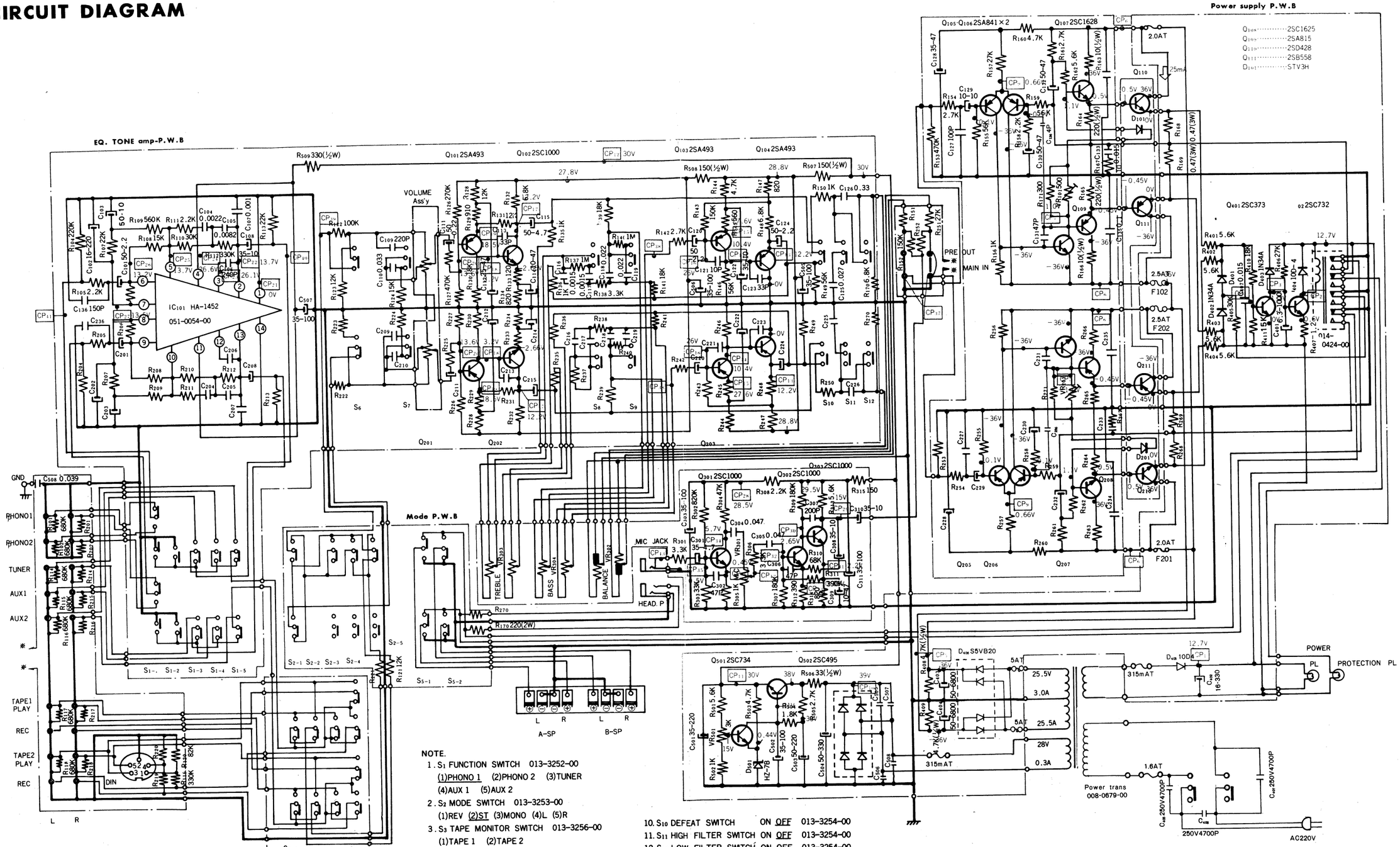
⊙INPUT P.W.B


To DIN terminal
Extension lead
852-5068-00
To tape P.W.B
099-4529-01
Extension lead
852-5062-00
To power supply P.W.B
(099-4533-03)
Special lead
816-0333-00
To mic-P.W.B
(099-4531-01)
Shielded wire
815-1300-00
To mic-P.W.B
(099-4531-01)
Extension lead
852-5072-00
To equalizer tone amp.P.W.B
099-4528-01
Extension lead
852-5104-00
To equalizer tone amp.P.W.B
(099-4528-01)
To chassis
Special lead
816-0489-00

SUBSTANC WIRING DIAGRAM



■CIRCUIT DIAGRAM



NOTE.

1. S_1 FUNCTION SWITCH 013-3252-00
   (1)PHONO 1 (2)PHONO 2 (3)TUNER
   (4)AUX 1 (5)AUX 2
2. S_2 MODE SWITCH 013-3253-00
   (1)REV (2)ST (3)MONO (4)L (5)R
3. S_3 TAPE MONITOR SWITCH 013-3256-00
   (1)TAPE 1 (2)TAPE 2
4. S_4 TAPE DUPLICATE SWITCH 013-3256-00
   (1)TAPE 1 → 2 (2)TAPE 2 → 1
5. S_5 SPEAKERS SWITCH 013-3253-00
   (1) A (2) B
6. S_6 MUTING SWITCH ON OFF 013-3254-00
7. S_7 LOUDNESS SWITCH ON OFF 013-3254-00
8. S_8 TREBLE TURNOVER SWITCH 013-3254-00
   5.0KHz 2.5KHz
9. S_9 BASS TURNOVER SWITCH 013-3254-00
   250Hz 500Hz
10. S_{10} DEFEAT SWITCH ON OFF 013-3254-00
11. S_{11} HIGH FILTER SWITCH ON OFF 013-3254-00
12. S_{12} LOW FILTER SWITCH ON OFF 013-3254-00
13. S_{13} POWER SWITCH ON OFF 013-3317-00
14. Above mentioned under line indicates switch position on the circuit diagram.
15. VOLUME 012-3474-00
16. BALANCE 012-3510-00
17. TREBLE 012-3476-00
18. BASS 012-3476-00
19. MIC VR 012-3475-00
20. All resistors ¼W unless otherwise

Voltage measurement, multimeter used, suitable
SANWA A-303TR-DII
MULTITESTER
DC.V·····Suitable range
Voltage of protection section are with respect to protection section ground line(different from case ground).